Docket No.: 043888-0314 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	:	Customer Number: 53080
Yuu INATOMI, et al.	:	Confirmation Number: 2569
Application No.: 10/827,424	:	Tech Center Art Unit: 1795
Filed: April 20, 2004	:	Examiner: Chu, Helen Ok

For: ELECTROCHEMICAL DEVICE AND ELECTRODE ACTIVE MATERIAL FOR ELECTROCHEMICAL DEVICE

TRANSMITTAL OF APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith is Appellant's Appeal Brief in support of the Notice of Appeal filed April 11, 2008. Please charge the Appeal Brief fee of $510.00 to Deposit Account 500417.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due under 37 C.F.R. 1.17 and 41.20, and in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP

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Date: June 11, 2008

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APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
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Alexandria, VA 22313-1450

Sir:

This Appeal Brief is submitted in support of the Notice of Appeal filed April 11, 2008, wherein Appellant appeals from the Primary Examiner's rejection of claims 22, 25, 28, 32, 35, 38, 41, 44, 47, 50 and 53.

Real Party In Interest

This application is assigned to Matsushita Electric Industrial Co., LTD by assignment recorded on April 20, 2004, at Reel 015236, Frame 0067.

Related Appeals and Interferences

To the best of Applicants' and Applicants representatives' knowledge, there are no related appeals or interferences (see Related Proceedings Appendix).

Status of Claims

1. Claims canceled: 1-19, 21, 56 and 58

2. Claims withdrawn from consideration, but not canceled: 20, 23, 24, 26, 27, 29-31, 33, 34, 36, 37, 39, 40, 42, 43, 45, 46, 48, 49, 51, 52, 55 and 57.

3. Claims pending: 22, 25, 28, 32, 35, 38, 41, 44, 47, 50 and 53

4. Claims allowed: None

5. Claims rejected: 22, 25, 28, 32, 35, 38, 41, 44, 47, 50 and 53

6. Claims on appeal: 22, 25, 28, 32, 35, 38, 41, 44, 47, 50 and 53

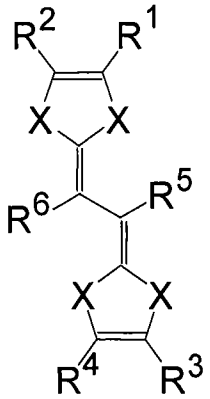
Status of Amendments

No amendments to the claims have been made after the Final Rejection issued on January 11, 2008.

Summary of Claimed Subject Matter

One embodiment of the present invention as recited in independent claim 32 is directed to a secondary battery (Spec. p. 14:16), comprising a positive electrode, a negative electrode and an electrolyte,

wherein at least one of said positive electrode and said negative electrode includes an electrode active material comprising a compound having a structure represented by the general formula (1a):



where X is a sulfur atom or an oxygen atom; each of R^1 to R^4 is independently a linear or cyclic aliphatic group, a hydrogen atom, a hydroxyl group, a cyano group, an amino group, a nitro group or a nitroso group; each of R^5 and R^6 is independently a linear or cyclic aliphatic group, or a hydrogen atom; said aliphatic group includes at least one selected from the group consisting of an oxygen atom, a nitrogen atom, a sulfur atom, a silicon atom, a phosphorus atom, a boron atom, and a halogen atom. (Spec. p. 6:11-7:5)

Ground of Rejection To Be Reviewed By Appeal

(1) Claims 22, 25, 28, 32, 35, 38, 41, 44, 47, 50 and 53 were rejected under 35 U.S.C. § 103(a) for obviousness predicated upon Zhang et al. (USP No. 6,110,619) ("Zhang") in view of Carlier et al. (Publication Electrochimica Acta).

Argument

(1) Claim 32 is not obvious under 35 U.S.C. § 103(a) over Zhang in view of Carlier.

Applicants respectfully traverse this rejection for at least the following reasons.

Independent claim 32 recites a secondary battery, comprising a positive electrode, a negative electrode and an electrolyte, wherein at least one of said positive electrode and said negative electrode includes an electrode active material comprising a compound having a structure represented by the general formula (1a) shown above,

where X is a sulfur atom or an oxygen atom; each of R^1 to R^4 is independently a linear or cyclic aliphatic group, a hydrogen atom, a hydroxyl group, a cyano group, an amino group, a nitro group or a nitroso group; each of R^5 and R^6 is independently a linear or cyclic aliphatic group, or a hydrogen atom; said aliphatic group includes at least one selected from the group consisting of an oxygen atom, a nitrogen atom, a sulfur atom, a silicon atom, a phosphorus atom, a boron atom, and a halogen atom.

It was admitted that Zhang fails to teach the specific compound of formula 1(a). Carlier is alleged to remedy this deficiency by disclosing a compound of formula 1(a). In addition, it was alleged that Zhang teaches that the positive electrode active material has an organo-sulfur structure. Thus, it is implied that Zhang suggests a compound of formula 1(a) could be used in the secondary battery of Zhang.

Applicants previously replied that the passage of Zhang cited in the Office Action (col. 2, line 52) states that "herein, the term 'organo-sulfur materials' means **a material containing organic sulfur compounds with only single or double carbon-sulfur or sulfur-sulfur bonds**". It was then argued by Applicants that as the compound of general formula 1(a) contains carbon-carbon bonds, then compound 1(a) does not fall into the category of organo-sulfur compounds *as defined in the Zhang reference*. In fact, nowhere in Zhang is there a mention of the use of a compound of formula 1(a) as a positive electrode active material.

In response to the above-mentioned argument, the Examiner stated that because the term "containing" is used, the phrase means that the only bonds between carbon and sulfur or sulfur and

sulfur are single or double, but that the compound can have other bonds as well. As such, the Examiner holds that the tetrathiofulvalene (TTF) compound of Carlier is an "organo-sulfur compound" as described by Zhang.

Furthermore, the Examiner stated that Carlier discloses an organo-sulfur compound that is "electrochemically active which displays conformational changes associated with electron transfer", and that it discloses redox properties of a series of substituted vinylogous TTF prepared by oxidative coupling (dimerization) of DTF.

In response to this allegation, Applicants would point out that Zhang describes that these "organo-sulfur" compounds "undergo polymerization (dimerization) and de-polymerization (disulfide cleavage) upon the formation and breaking of the disulfide bonds...which results in lower molecular weight polymeric and monomeric species, which may dissolve into the electrolyte and cause self-discharge, reduced capacity, and eventually complete cell failure, ***thereby severely reducing the utility of organo-sulfur materials as a cathode-active material in secondary batteries***". Furthermore, Zhang further states that ***"the organo-sulfur materials typically contain less than 50 weight percent of sulfur...so they have a much lower energy density or specific capacity than elemental sulfur***" (see, col. 2, line 63- col. 3, line 14 of Zhang).

Moreover, Zhang discloses in col. 10, lines 9-13, the use of an organo-sulfur material in which the electrochemical activity (electrode reaction) involved the formation and breaking of S-S covalent bonds. In contrast, Carlier is silent with regard to the effectiveness of using TTF as an active material for a secondary battery. TTF does not involve S-S bonds in the generation of electrochemical activity.

Accordingly, one skilled in the art would **not** be persuaded to combine Carlier, which teaches a dimerized material and does not teach or suggest the usefulness of TTF in a secondary battery, with Zhang, which clearly teaches against the use of "organo-sulfur compounds", especially dimerized

compounds, in secondary batteries. Thus, Zhang teaches away from the use of a dimerized compound as disclosed in Carlier, as the compound of Carlier would severely reduce the utility of organo-sulfur materials as a cathode-active material in secondary batteries.

As is well known in patent law, if a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). As Zhang describes how a compound as disclosed in Carlier would render the battery of Zhang inoperable for its intended purpose, there is no suggestion or motivation to make the proposed combination of Zhang with Carlier. Accordingly, Applicants respectfully submit that the § 103 rejection of claim 32 over Zhang and Carlier is improper.

(2) Claims 22, 25, 28, 35, 38, 41, 44, 47, 50 and 53 are not obvious under 35 U.S.C. § 103(a) over Zhang in view of Carlier.

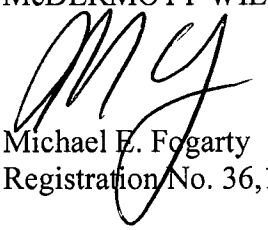
As claims 22, 25, 28, 35, 38, 41, 44, 47, 50 and 53 are dependent upon claim 32, and claim 32 is allowable for the reasons set forth above, Applicants submit that claims 22, 25, 28, 35, 38, 41, 44, 47, 50 and 53 are allowable over the combination of Zhang and Carlier as well.

Conclusion

For all of the foregoing reasons, Appellants respectfully submit that the grounds of rejection of the claims on appeal is in error and should be reversed. To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



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CLAIMS APPENDIX

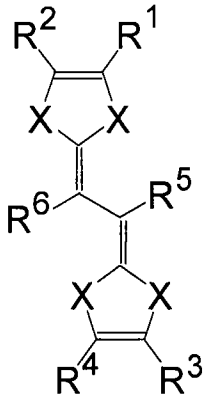
22. The secondary battery in accordance with claim 32, wherein said compound is a polymer compound having more than one structure represented by the general formula (1a).

25. The secondary battery in accordance with claim 22, wherein said polymer compound has a polyacetylene chain or a polymethacrylate chain as a main chain.

28. The secondary battery in accordance with claim 32, wherein the number of carbon atoms in the aliphatic group is in the range of 1 to 6.

32. A secondary battery, comprising a positive electrode, a negative electrode and an electrolyte,

wherein at least one of said positive electrode and said negative electrode includes an electrode active material comprising a compound having a structure represented by the general formula (1a):



where X is a sulfur atom or an oxygen atom; each of R^1 to R^4 is independently a linear or cyclic aliphatic group, a hydrogen atom, a hydroxyl group, a cyano group, an amino group, a nitro group or a nitroso group; each of R^5 and R^6 is independently a linear or cyclic aliphatic group, or a hydrogen atom; said aliphatic group includes at least one selected from the group consisting of an oxygen atom, a nitrogen atom, a sulfur atom, a silicon atom, a phosphorus atom, a boron atom, and a halogen atom.

35. The secondary battery in accordance with claim 32,

wherein said electrolyte comprises a solvent, and an anion and a cation that diffuse in said solvent, and said compound is capable of forming a coordinate bond with said cation through an oxidation-reduction reaction.

38. The secondary battery in accordance with claim 35, wherein said cation is a lithium ion.

41. The secondary battery in accordance with claim 32, wherein said positive electrode includes said compound as a positive electrode active material, and said negative electrode includes a carbon material as a negative electrode active material.

44. The secondary battery in accordance with claim 32, wherein said positive electrode includes said compound as a positive electrode active material, and said negative electrode includes, as a negative electrode active material, at least one selected from the group consisting of a lithium metal, a lithium-containing composite nitride and a lithium-containing composite titanium oxide.

47. The secondary battery in accordance with claim 32, wherein said negative electrode includes said compound as a negative electrode active material, and said positive electrode includes a metal oxide material as a positive electrode material.

50. The secondary battery in accordance with claim 32, wherein, when said compound is used as an electrode active material, a conductive material is mixed into the electrode active material.

53. The secondary battery in accordance with claim 32, wherein, when said positive electrode includes said compound as a positive electrode active material, one of the following is used as the negative electrode material of said negative electrode: a carbon material, a lithium metal, a lithium-containing composite nitride, a lithium-containing composite titanium oxide, a composite material of tin and carbon, and a composite material of tin and another metal.

EVIDENCE APPENDIX

No evidence provided during prosecution, but available upon request.

RELATED PROCEEDINGS APPENDIX

To the best of Applicants' and Applicants representatives' knowledge, there are no related appeals or interferences.